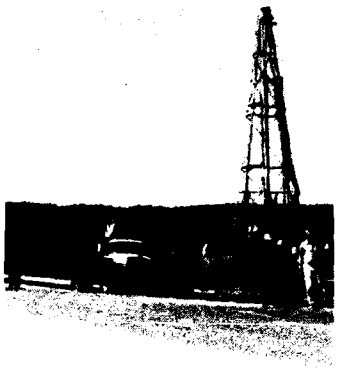
US Army Corps of Engineers

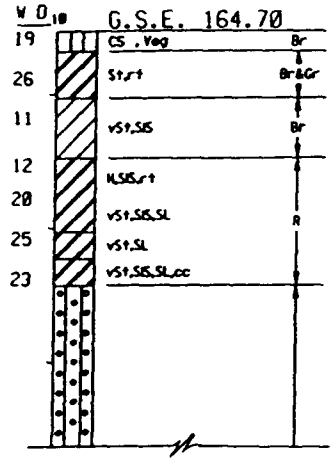
COMPUTER APPLICATIONS IN GEOTECHNICAL ENGINEERING (CAGE)

INSTRUCTION REPORT GL-92-2

USER'S GUIDE FOR THE BORING LOG DESIGN FILE BUILDER

VERSION 2.01





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May 1992
Final Report

Prepared for DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Washington, DC 20314-1000

Under Contract No. DACW39-91-C-0024

Monitored by Geotechnical Laboratory
US Army Engineer Waterways Experiment Station
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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	May 1992	Final report

4. TITLE AND SUBTITLE
User's Guide for the Boring Log Design File Builder, Version 2.01

5. FUNDING NUMBERS
Contract No. DACW39-91-C-0024

6. AUTHOR(S)
Keith Nash

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Nash Computing Services, 3112 Magnolia Street
North Little Rock, AR 72116

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
US Army Corps of Engineers
Washington, DC 20314-1000

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
Instruction Report GL-92-2

11. SUPPLEMENTARY NOTES
See reverse.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

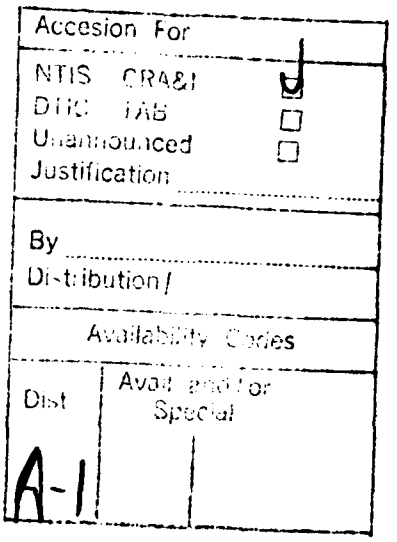
The US Army Engineer Waterways Experiment Station (WES) contracted with Nash Computing Services (NCS) to modify and enhance the Boring Log Design File builder (BP), a PC-based MicroStation utility for creating boring log design files. BP was originally developed for the Vicksburg District, US Army Corps of Engineers, to replace an older, minicomputer-based plot system previously in use there. Input for the BP program consists of ASCII data files created by a dBASE III boring log database management system. The format of these input files is derived from a standard originally developed at the New Orleans District nearly 25 years ago. The BP program places boring log plate data into MicroStation design files using Corps-standard soil and rock symbology. These design files may be modified and plotted on any Intergraph platform (i.e., PC's or UNIX workstations running MicroStation or VAX minicomputers running IGDS). The initial version of BP had several shortcomings that have been rectified in the new release. These include memory requirements, configurability, and conformance to Corps standards regarding plate size, cell library, symbology, and scaling.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Boring log database CADD boring logs	32
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

11. (Continued).

Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. This report was prepared under the Computer Applications in Geotechnical Engineering (CAGE) Project.



PREFACE

The US Army Engineer Waterways Experiment Station (WES) contracted with Nash Computing Services (NCS) to modify and enhance the Boring Log Design File Builder (BP), a PC-based MicroStation utility for creating boring log design files. BP was originally developed for the Vicksburg District, US Army Corps of Engineers, to replace an older, minicomputer-based plot system previously in use there. Input for the BP program consists of ASCII data files created by a DBASE III boring log database management system. The format of these input files is derived from a standard originally developed at the New Orleans District nearly 25 years ago. The BP program places boring log plate data into MicroStation design files using Corps-standard soil and rock symbology. These design files may be modified and plotted on any Intergraph platform (i.e., PC's or UNIX workstations running MicroStation or VAX minicomputers running IGDS). The initial version of BP, documented in WES MP ITL-91-2, had several shortcomings that have been rectified in the new release. These include memory requirements, configurability, and conformance to Corps standards regarding plate size, cell library, symbology, and scaling.

BP was originally written by Mr. Keith Nash (NCS) and Ms. Brenda Scott (Little Rock District) while both were employed by FTN Associates, Ltd., Little Rock, Arkansas. The current release was written by Mr. Nash (NCS). Mr. Earl V. Edris, Jr., P.E., Soil and Rock Mechanics Division (SRMD), Geotechnical Laboratory (GL), WES was the Contract Monitor. Mr. Chris Dixon, P.E. (Vicksburg District), Mr. Pat Conroy, P.E. (St. Louis District), Ms. Linda Wichlan (St. Louis District), and Ms. Scott (Little Rock District) reviewed the program and were invaluable in providing assistance and suggestions for improvements during the project. The author gratefully acknowledges all of these individuals, as well as the helpful assistance of Ms. Norma E. Logue and Ms. Emma Cessna of the WES Contracting Division.

This program development is part of the Computer Applications in Geotechnical Engineering (CAGE) project sponsored by the Headquarters, US Army Corps of Engineers (USACE). The USACE Technical Monitor is Mr. Art Walz. The CAGE project's Principal Investigator is Mr. Edris. The development of this CAGE package was accomplished under the supervision of Dr. Don C. Banks, Chief, SRMD, GL, and under the general supervision of Dr. William F. Marcuson III, Director, GL.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander and Deputy Director was COL Leonard G. Hassell, EN.

CONTENTS

PART I: PROGRAM OVERVIEW

Overview

1. The Boring Log Plot (BP) system is a set of PC-based programs which, in conjunction with Intergraph's MicroStation v3.3 software, allow the user to generate boring log plates for plotting or display on any Intergraph CADD platform. Figure 1 shows how this set of programs fit into the work flow for creating finished boring logs from field data. BP supports boring log plates containing one, two, or three rows of boring logs, each row containing as many as eleven logs. It also analyzes plate layout for boring log overlap and title block overwrite and issues a warning when it detects either condition.

2. BP is menu-driven and very easy to use. Context-sensitive help is available to provide detailed information about the function of each menu or data entry form. Users may configure the system for their specific needs by specifying the name of their organization, the seed design file and cell library to be used, margins and title block sizes for each of the supported ANSI plate sizes, and the intended output device (laser printer, pen plotter, or electrostatic plotter). In addition, users may configure the text sizes used for borings, the font, weight, height, and width for each of six lines of title block text, and a table of line weights to be used by each of the three supported output device types (laser printer, pen plotter, or electrostatic plotter).

3. Input consists of fixed-length ASCII text data files which typically are produced by a dBase III boring log database management system available from WES. However, users are not restricted to using this database manager and may produce the data files in whatever manner is appropriate. The data file format is described completely in Appendix B. Data supported by BP include: boring log identifier, location, field book number, ground surface elevation, water table depth and date, sample date, tertiary (top of rock) depth, water content, sample class, strata soil or rock type, consistency, color, penetration resistance, two compression tests, Atterburgh limits (liquid and plastic), test results (C, Q, R, S, or all four tests), and D_{10} size.

4. Design files produced by BP adhere to all applicable Corps geotechnical standards with respect to scaling, plate size, cell library, and soil and rock symbology and may be utilized on any Intergraph CADD platform, including PC, UNIX, or VAX workstations. BP produces design files with working units of feet, inches, and 8,000 positional units (1:12:8000). Plate sizes available include the ANSI-standard A (horizontal and vertical), B, C, D, E, and F specifications.

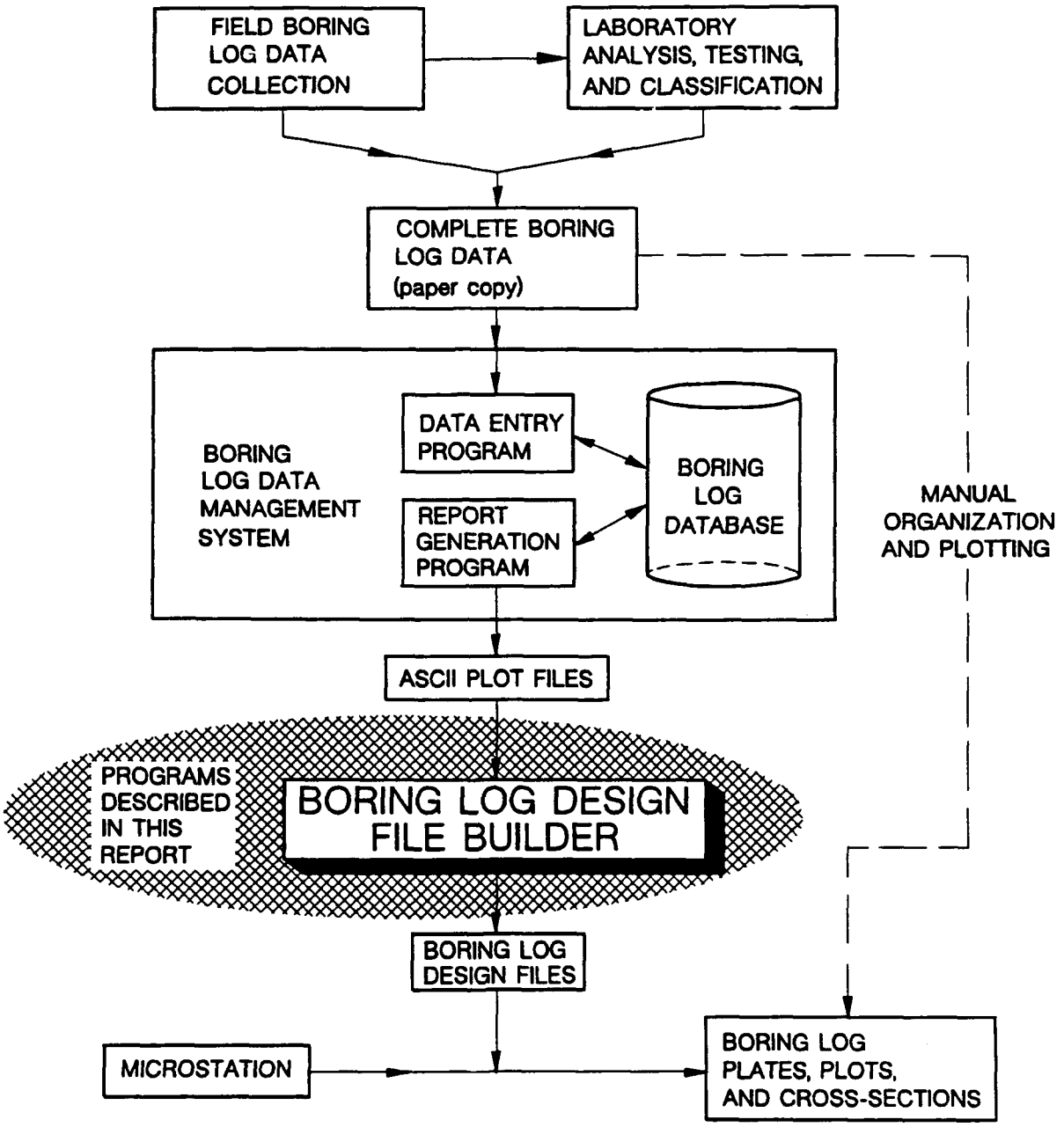
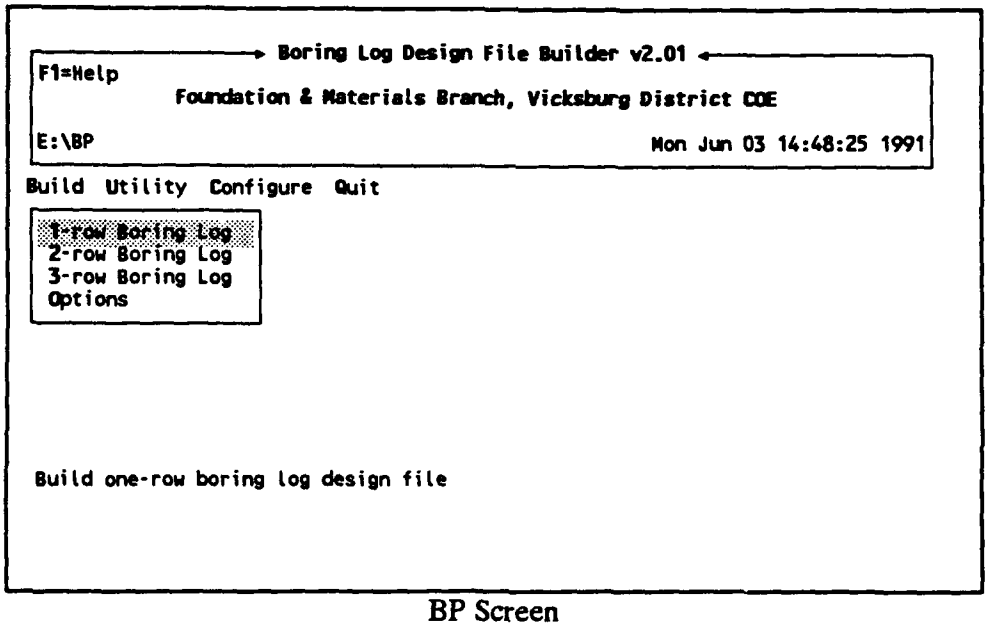


Figure 1 Boring Log Data Work Flow

A slightly modified copy of the GEO.CEL geotechnical cell library is used for patterning soil and rock strata and for generating arrows, water table depth indicators, and various other symbols. Users may, however, use another cell library if this is deemed necessary, provided the alternate cell library contains the required cells. Appendix D contains a full listing of all cells currently used by BP. Appendix E describes a procedure for modifying or extending the strata-to-cell mapping used by BP when building design files. As an aid in quickly producing check plots, BP allows the user to disable strata patterning, typically the most time-consuming step in producing design files.

The BP Screen

5. The BP screen shown below contains several items of interest. The window at the top of the screen is called the status window. The title at the top of the status window shows the name of the program and the version number. The name of your organization is centered in the middle of the status window. The current date and time appears at the lower right of the status window. The current working drive and directory is displayed at the lower left of the status window.



BP Screen

Using Menus

6. The main menu appears directly beneath the status window. The BP main menu has four selections: *Build*, *Utility*, *Configure*, and *Quit*. *Quit* simply exits the program and returns to DOS. The other selections invoke sub-menus and are described in detail later in this User Guide. You navigate between main menu items by using the left and right cursor keys. The up and down cursor keys scroll through the sub-menu choices under each main menu item. Notice that the *1-row Boring Log* sub-menu item under *Build* is highlighted: this means that pressing **ENTER** would select it for processing. Alternatively, menu items may be selected by pressing the item's selection character. This character, usually the first character of the item's name, is displayed on the screen with a unique color so that it is easy to find. Notice also that a short description of what the *1-row Boring Log* choice does appears on the last line of the screen. This line is called the message field, and is constantly updated to show what the currently highlighted menu item does. Throughout the rest of this manual, menu items will be shown in italics, and sequences of selections will be specified this way: *MenuItem->SubMenuItem*, to indicate a given main menu and sub-menu choice.

Data Entry Forms

7. BP uses data entry forms to allow you to enter information. The left and right cursor keys (←,→) allow you to scroll back and forth within a field. The up and down cursor keys (↑,↓) move to the previous or succeeding field in multi-field forms. Pressing **ESC** aborts the data entry form and returns you to the calling sub-menu item. Several BP data entry forms require you to press **F10** in order to process the data. Others begin processing when you press the **ENTER** key. BP displays information in the message field indicating if **F10** is required for a particular data entry form.

Choice Lists

8. Some BP data entry fields, particularly filename fields, have choice lists of available valid entries. If this is the case, you may press **F2** to invoke the choice list and make a selection. Select a choice list item by highlighting it with the up and down cursor keys (↑,↓) and pressing **ENTER**. Press **ESC** if you do not wish to make a selection. BP will indicate in the message

field that the **F2** key may be used if a choice list is available for a given data entry field.

Help

9. You can obtain context-sensitive help anywhere in BP by pressing the **F1** key. BP will display help information in a window at the bottom of your display screen. You may scroll through the help text with the cursor keys, or press **ESC** or **ENTER** to exit the help system.

MicroStation Considerations

10. BP was designed to adhere to Corps of Engineers standards contained in EM 1110-1-1807[1] pertaining to the use of MicroStation design files and cell libraries. The seed design file which you use with BP should therefore conform to these standards, particularly with regard to working units. BP uses the standard working units of feet, inches, and 8,000 positional units (1:12:8000). Cells are scaled by a factor of 12.0 when patterning, according to Corps specifications. This means that cells in the cell library you specify must have been created at a scale of 1 inch = 1 inch. The seed design file and cell library distributed with BP both meet these requirements, so the safest approach to customizing BP would be to modify copies of these files.

11. Note that the MicroStation resident handler (part of Microstation v3.3 software) must be loaded into memory prior to running BP. This may be accomplished by running MicroStation before executing BP, or by modifying a copy of the USTATION.BAT file and replacing the MicroStation call with a call to BP.EXE. See **Appendix A** for more information about installing and running BP.

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[1] Headquarters, Department of the Army. 1990. "Standards Manual for U.S. Army Corps of Engineers Computer-Aided Design and Drafting (CADD) Systems," Engineering Manual 1110-1-1807, Washington, DC.

PART II: BUILD MENU

12. The *Build* main menu selection provides for the actual construction of boring log design files. The four sub-menus available under *Build* allow you to build design files containing 1, 2, or 3 rows of boring logs with each row containing as many as eleven logs, and to set options controlling the appearance of design files created by the program.

13. Note that BP will automatically append the appropriate default filename extension if you do not enter one as part of a data or design file specification. Default extensions are derived from the data and design file wildcard specifications you provide (see *Configure->Wildcards*). If you wish to specify a file that has no extension you must include the '.' in the filename (e.g., to specify a file named 'FOO', enter 'FOO.'), otherwise BP will append the default extension.

14. Before actually building the design file, BP analyzes the data file(s) and, if it finds logs which are too long to fit on the prescribed Y-axis, builds split-log data files. Split-log data files have the same name as the data file from which they are derived, but have .DSL extensions. BP replaces data file specifications with their corresponding split-log counterparts so that the resulting design file will contain split logs. You can have BP automatically search for and delete split-log data files over 7 days old when it exits in order to save disk space (see *Configure->Remove* files).

1-row Boring Log

15. This selection allows you to build a design file containing a single row of logs. BP displays a data entry form where you enter the data and design files you want BP to use. Choice lists are available for both the data and design file fields if BP finds any data or design files in the working directory at start-up.

2-row Boring Log

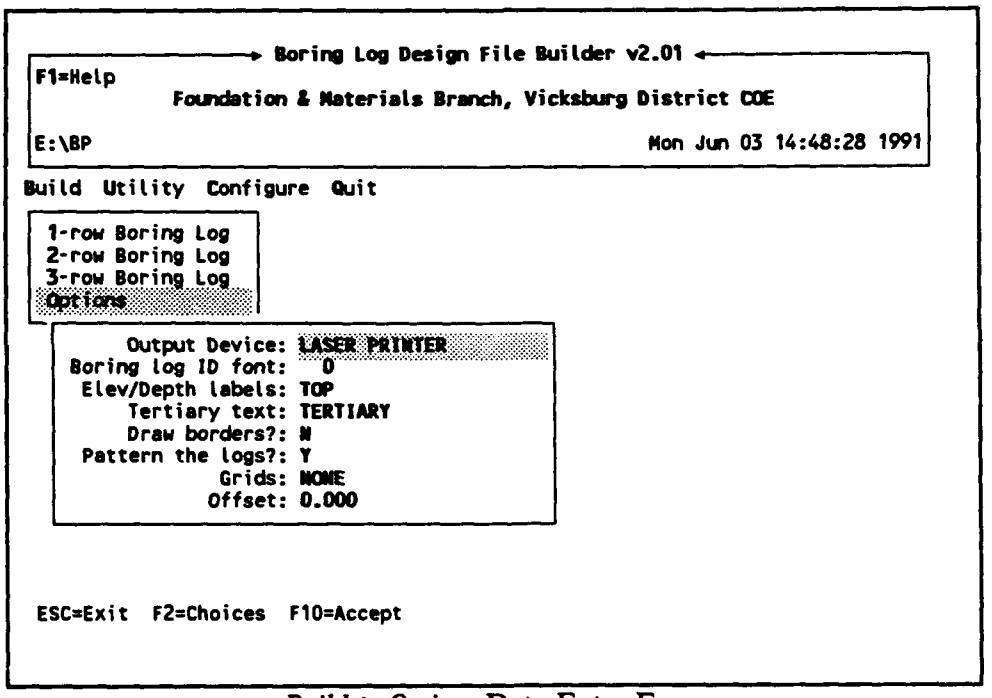
16. This selection allows you to build a design file containing two rows of logs. BP displays a data entry form where you enter the data and design files you want BP to use. Choice lists are available for both the data and design file fields if BP finds any data or design files in the working directory at start-up.

3-row Boring Log

17. This selection allows you to build a design file containing three rows of logs. BP displays a data entry form where you enter the data and design files you want BP to use. Choice lists are available for both the data and design file fields if BP finds any data or design files in the working directory at start-up.

Options

18. The *Options* sub-menu invokes a data entry form (shown below) which allows you to set several runtime options, including:



Build-> Options Data Entry Form

19. Output Device Type. BP provides support for three device types: electrostatic plotters, pen plotters, and laser printers. BP does not send output directly to these devices; instead it associates line weight tables with each device. You may edit these line weight tables so that the design files created by BP will plot attractively when you generate hardcopy output. See *Configure-> Device* for information about specifying device line weight tables. This is a protected field with a choice list, so you will need to press **F2** to change its value.

20. Boring Log ID Font. BP lets you specify the text font to use when placing boring log IDs.

21. Elevation/Depth Labels. You may choose to have BP label elevation/depth at the top of each log, the bottom of each log, or both. This is a protected field with a choice list, so you will need to press **F2** to change its value.

22. Tertiary Text. You may specify the 8-character label BP places at the 'tertiary' depth.

23. Borders and Title Block. If requested, BP will place borders and a title block in design files it creates. This accommodates those users who do not use reference files for this purpose.

24. Pattern. This option allows users to skip the most time-consuming step in building boring log design files - patterning the strata. This would be useful if you are only interested in verifying the layout or general appearance of a plate.

25. Grids. Indicate the type of grid you want placed in the design file. Choices include: no grid, horizontal grid only, or horizontal and vertical grids.

26. Offset. Enter the distance (in inches) you want the water table depth and tertiary depth shifted leftward. Set this value to zero to have these items placed in their normal positions.

PART III: UTILITY MENU

27. The *Utility* menu provides several functions to simplify the job of building boring log plates.

Analyze

28. Use *Analyze* to verify the layout of a plate without actually building a design file. BP displays the results in a screen window and will also write them to the log file (BP.LOG). See **Appendix A** for more information about the log and other BP options.

29. If the BP plate analysis routine finds logs which are too long to fit on the prescribed Y-axis, it will build a split-log data file. Split-log data files have the same filename as the data file from which they are derived, but have .DSL extensions. BP will replace the data file with its split-log counterpart so that the resulting design file will contain split logs.

Change Dir

30. This selection allows you to change the current working drive and/or directory. BP requires data files you specify to exist in the current working directory. It also creates design files in the current working directory. If you organize your projects by directories, this feature allows you to switch between projects without having to exit from the BP program.

31. Note that BP will re-read its initialization file (BP.INI) if it finds one in the new directory: this allows you to customize BP for different projects, see Appendix A, Directory Considerations section.

View

32. This item lets you invoke an editor or file viewing utility. BP displays a data entry form where you specify the file you wish to view or edit. You may enter any valid DOS filename specification, including the '*' and '?' wildcards. Entering a wildcard specification or blank field causes BP to build and display a choice list of filenames matching the specification (entering a blank field is equivalent to entering a '*.*' wildcard specification). You may then select a file from the choice list. See *Configure->File Viewer* for more information about

specifying the editor or file viewing program.

PART IV: CONFIGURE MENU

33. The *Configure* menu selections let you tailor certain BP features that typically do not need to be changed very often.

Cell Library

34. This item lets you specify the cell library used by BP. BP is distributed with a modified copy of the geotechnical Corps-standard GEO.CEL cell library (BP_CELL.CEL) that should be adequate for most users. However, if you wish to use a different cell library, specify it here. Enter a complete DOS filename specification, including drive and directory.

Device

35. BP places design file elements using line weight tables associated with three output devices: electrostatic plotters, pen plotters, and laser printers. Each line weight table has three values, one for placing the 'paper edge' trimline, one for placing lines, and one for placing text. This sub-menu lets you edit the line weight tables with a data entry form.

File Viewer

36. *File Viewer* lets you specify the editor or file viewing program BP should use when you issue the *Utility->View* command. The shareware program LIST.COM is a good choice for this purpose, but you may choose any program that will run in the available memory. If the program is not in the DOS PATH you will need to give a complete path specification, including drive and directory. You may also indicate any necessary command-line arguments.

Plate

37. BP supports the following ANSI plate sizes: A, A (vertical), B, C, D, E, and F. This command lets you specify the top, bottom, left, and right margins and the title block height and width for each of the ANSI plate sizes. These values are in units of inches. BP is distributed with these values set to the values recommended by ANSI.

Seed File

38. This command lets you specify the seed design file used by BP to create design files. This seed file should conform to the applicable Corps standards. In particular, it should have working units of feet, inches, and 8000 positional units. Enter a complete DOS filename specification, including drive and directory.

Title Block

39. BP lets you specify the font, weight, text height, and text width for each of the six possible lines of title block text. This sub-menu invokes a data entry form where you specify these values.

User Name

40. *User Name* lets you modify the name of your organization. This is the name BP displays centered in the status window.

Wildcards

41. Whenever you start BP (or change working directories with *Utility-> Change Dir*) it builds choice lists of data and design files which exist in the current directory. This command lets you specify the DOS wildcards used to build the choice lists. BP is distributed with these values set to '*.TXT' for data files and '*.DGN' for design files.

Remove files

42. BP creates split-log data files when its analysis routine finds logs which are too long to fit on the prescribed Y-axis. These files have the same name as the data files from which they are derived, but have .DSL extensions. You may wish to keep these files, in which case you should set this option to 'N'. Set the option to 'Y' if you want BP to delete the .DSL files. BP will then search for .DSL files every time it exits and delete any that are seven or more days old.

Text Sizes

43. This option lets you specify text sizes for twelve classes of text which BP places in design files. Care should be taken when modifying the values distributed with BP: too large a variation from these values will yield undesirable results such as overwriting of text.

PART V: BP QUICK REFERENCE

Build

1-row Boring Log	Build 1-row boring log design file
2-row Boring Log	Build 2-row boring log design file
3-row Boring Log	Build 3-row boring log design file
Options	Set runtime options

Utility

Analyze	Verify plate layout and appearance
Change dir	Change working drive and/or directory
View	View or edit a file

Configure

Cell library	Specify cell library
Device	Specify device line weight tables
File viewer	Specify file viewing program
Plate	Specify margins and title block size for ANSI plates
Seed file	Specify seed design file
Title block	Specify font, weight, and text size for each line of title block text
User name	Specify organization name
Wildcards	Specify wildcards for text and design files
Remove files	Specify whether BP should delete split-log (.DSL) data files
text siZes	Specify text sizes for design files created by BP

Quit ..... Exit BP program and return to DOS

APPENDIX A: INSTALLING BP

System Requirements

1. BP requires 356 kB of free RAM to run. This is the minimum amount of RAM which must be available *after* loading the MicroStation resident scanner. Since BP is a MicroStation utility program, it requires that your PC be equipped with a math coprocessor. In addition, there must be enough hard disk space to accommodate the BP system files (approximately 1 MB) as well as sufficient space to store the design files BP creates.

Installing the BP System Files

2. To install the BP system, insert the distribution diskette in a floppy drive, make that floppy drive the default drive, and enter BPINSTAL at the DOS prompt. The installation program prompts you for the information it needs to install BP on your PC. You may press the F1 key to obtain context-sensitive help about the installation process. Explicit instructions for installing the system from drive A: follow:

1) Insert distribution disk in drive A:

2) Make drive A: the default drive:

A: (enter)

3) Run the installation program:

BPINSTAL (enter)

The BP distribution disk contains three files:

- BPINSTAL.EXE - BP installation program
- BPINSTAL.HLP - Help file for the BP installation program
- BPSYSTEM.EXE - BP program files, cell library, and seed design file

Directory Considerations

3. BPINSTAL.EXE installs the BP executables and initialization file in a user-specified directory. This directory *should* lie in the DOS PATH, but need not if the user will always work with BP in a single directory. The BP program looks for its initialization file (BP.INI) in the current working directory. If BP.INI is not found there, BP looks in the directory from which it

was executed (i.e., the directory where BP.EXE is located). Users who need special setups for different projects in separate directories may wish to copy BP.INI to the project directory so that BP will load a unique BP.INI for the project. Most users, however, will find that a single copy of BP.INI is sufficient for their needs.

DOS File Handles

4. Make sure your PC's CONFIG.SYS file specifies that DOS should provide at least 20 file handles. CONFIG.SYS should contain a line that looks like this: FILES=20.

5. If FILES is set to a higher value, you do not need to modify CONFIG.SYS.

Running BP

6. To execute BP, simply enter **BP** at the DOS prompt. If you have installed BP in a directory that is not in the DOS PATH you will need to change to that directory before running the program. Alternatively, you may wish to modify a copy of the USTATION.BAT batch file and replace the MicroStation call with a call to BP.

BP Command Line Options

7. BP has two user command-line options. Command-line options are specified on the DOS command line when you run the BP program. These options include:

-b: Run BP in black and white mode

Purpose: Some users may use a monochrome monitor with a color graphics adapter (i.e., colors are represented by various shades of gray). The BP screens will be much more attractive and easier to read if you tell BP to run in black and white mode. If you want BP to run in black and white mode without using the -b option, use the DOS MODE command to set the default video mode to black and white (i.e., enter "MODE BW80" at the DOS prompt).

-d: Purpose: The purpose of this option is to provide detailed run-time debugging information in case you are experiencing problems with the BP program or are curious about the process of building design files. It causes BP to write a great deal of detailed run-time information to the BP log file (an ASCII text named BP.LOG), so you will

normally not want to use this option as it slows the program down somewhat.

Examples:

1) Suppose you have a monochrome monitor with a color graphics card and want to run BP in Black & White mode. Execute BP with the following command: BP -b.

2) To obtain debugging information in the log, execute BP with the following command: BP -d.

APPENDIX B: DATA FILE LAYOUT

1. Data files are formatted as follows: Each data file begins with a file header block consisting of 9 to 12 records, the number of file header block records depending on the number of plate notes included in the data file. Boring log data blocks follow the file header block. There may be as many as eleven (11) boring log data blocks in a data file. Each boring log data block consists of 6 boring log header records followed by an arbitrary number of boring log data records. Boring log data records contain either sample data or written descriptions. There is a special record type allowing for continuation of written descriptions. A boring log data block is terminated by an end-of-log record. The tables below describe each record type:

File Header Block - Record 1

Field	Columns	Range	Format	Description
1	1-5	-1 1	Integer	Vertical staff to left of each log Vertical staffs at right and left of plate
2	6-10	-1 1	Integer	Horizontal staff with distance in feet No horizontal staff
3	11-15	-1 1 -2	Integer	All staffs omitted (overrides fields 1 and 2) Left and right vertical staffs Horizontal staff with distance in feet (+00 stationing)
4	16-20	-1 1 -2	Integer	No modifications or written descriptions Modifications and written descriptions included No written descriptions
5	21-25	-1 1	Integer	"DEPTH IN FEET" label for vertical staffs "ELEVATION IN FEET N.G.V.D." label for vertical staffs
6	26-30	-1 1	Integer	Written descriptions in lower case Written descriptions in upper case
7	31-35	AV A B C (-1) D (1) E (-2) F	Text	Plate size = ANSI A (vertical, 11 x 8.5)[1] Plate size = ANSI A (horizontal, 8.5 x 11) Plate size = ANSI B (11 x 17) Plate size = ANSI C (17 x 22) Plate size = ANSI D (22 x 34) Plate size = ANSI E (34 x 44) Plate size = ANSI F (28 x 40)
8	36-40	*	Integer	Number of lines of notes minus 4
9	41-45	1	Integer	Function unknown - always 1

[1] Dimensions in inches, width (vertical) by length (horizontal), per ANSI Y14.1-1980

File Header Block - Record 2

Field	Columns	Range	Format	Description
1	1-10	*	Real	Maximum X-axis distance in feet
2	11-15	*	Real	Lower vertical staff elevation in feet
3	16-20	*	Real	Upper vertical staff elevation in feet
4	21-25	*	Real	Vertical (Y-axis) scale
5	26-30	*	Real	Horizontal (X-axis) scale
6	31-35	*	Ignored	Size of plate factor (ignored by BP)
7	36-40	1-11	Integer	Number of boring logs in data file (read but not used by BP)
8	41-50	*	Real	Starting X-axis distance in feet
9	51-55	*	Ignored	Percentage increase in letter size (ignored by BP)
10	56-60	*	Real	Title block height in inches (ignored by BP)
11	61-65	*	Real	Title block width in inches (ignored by BP)

File Header Block - Records 3-8

Field	Columns	Range	Format	Description
1	1-45	*	Text	Title block text

File Header Block - Records 9-12 (Optional)

Field	Columns	Range	Format	Description
1	1-45	*	Text	Drawing notes

Boring Log Header Records

Record	Field	Columns	Format	Description
1	1	1-10	Real	Distance from X-axis origin in feet
	2	11-20	Real	Ground surface elevation
	3	21-30	Real	Split-log elevation (used only by BP in split-log data files)
2	1	1-26	Text	Boring log ID
	2	27-29	Blank	
	3	30-39	Real	Tertiary depth in feet
3-4	1	1-25	Text	Location information
5	1	1-25	Text	Field book number
6	1	1-9	Date	Sample date (DD MMM YY)
	2	23-30	Date	Water table sample date (MM/DD/YY)
	3	31-40	Real	Water table depth in feet

Boring Log Data Record

Field	Columns	Format	Description
1	1-5	Real	Upper depth of sample in feet
2	6-10	Real	Lower depth of sample in feet
3	11-13	Integer	Water content (percent dry weight) or number of written description continuation records
4	14-18	Real	Stratum change in feet
5	19-20	Text	Main class
6	21-22	Text	'RO' indicates written description record - columns 26-51 contain written description
7	23-25	Text	Major modifications (strata type)
8	26-28	Text	Consistency
9	29-37	Text	Sample color(s), 1-3 allowed
10	38-51	Text	Modification symbol(s), 1-4 allowed
11	52-55	Real	Penetration resistance
12	56-59	Real	Unconfined compression test
13	60-62	Text	Test results (C,Q,R,S,T) (New field designed for use with BP)
14	63-65	Real	Liquid limit
15	66-68	Real	Plastic limit
16	69-73	Real	D_{10} size in millimeters
17	74-76	Real	Water content
18	77-80	Real	Second unconfined compression test

Boring Log Data Record - Written Description Continuation

Field	Columns	Format	Description
1	1-25	*	Blank
2	26-51	Text	Written description

Boring Log Data Record - End-of-boring

Field	Columns	Format	Description
1	1-5	Real	'999.9' indicates end of boring log data block

APPENDIX C - DESIGN FILE ELEMENT LEVELS

Levels Used By BP

Level	Elements
1	Boring log shapes
2	Consistency and modification symbols
3	Written descriptions
4	Colors and associated lines
5	Plastic limit, liquid limit, D_{10} size, water content
6	Boring log ID, station, location, field book number, sample date
7	Elevations above and below log and associated lines
8	Water table cell and observed date, Tertiary text and associated dashed line
9	Unconfined compression test, penetration resistance
10	Plate notes
60	Vertical and horizontal staffs
61	Grids
62	Border, title block, title block text
63	Paper-edge and title block trim lines

APPENDIX D - CELL LIBRARY

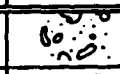
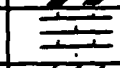
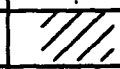
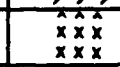
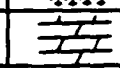
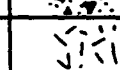
The BP_CELL.CEL library provided with BP is a modified copy of the Corps-standard GEO.CEL cell library. The only modifications to GEO.CEL were the inclusion two additional cells. One, named 'ARROW', was simply copied from the CORPS.CEL general-purpose cell library. The other, named 'WTRTBL', is used to indicate the water table depth. Five cells are used to identify the tests stored in field 13 of the boring log data record. Most cells used by BP are utilized for patterning strata: a table of these cells appears on the next page.

Miscellaneous Cells

Cell	Use
4TSTS	Four test ('T') indicator
ARROW	Line terminator
CDDSHR	'S' test indicator
CTST	'C' test indicator
CUTRX	'R' test indicator
UUTRX	'Q' test indicator
WTRTBL	Water table depth indicator

The table below shows the strata names and associated cells used for patterning. The strata names correspond to field 7 of a boring log data record.

Cells Used For Patterning Strata

Stratum	Cell	Material Name	Pattern
AGG	BREC	BRECCIA	
AND	ANDE	ANDESITE	
BAS	BASA	BASALT	
CEM	CEMSHA	CEMENTED SHALE	
CH	CH	USCS SOIL SYMBOL for CLAY	
CHA	CHAL	CHALK or MARL	
CL	CL	USCS SOIL SYMBOL for CLAY	
CLA	CLAY	CLAYSTONE or SILTSTONE	
COA	COAL	COAL	
CON	CONG	CONGLOMERATE	
DIO	DIOR	DIORITE	
DOL	DOLO	DOLOMITE	
GAB	GABB	GABBRO	
GC	GC	USCS SOIL SYMBOL for GRAVELS	
GM	GM	USCS SOIL SYMBOL for GRAVELS	
GNE	GNEI	GNEISS	
GP	GP	USCS SOIL SYMBOL for GRAVELS	
GRA	GRAY	GRAYWACKE	
GRN	GRAN	GRANITE	
GW	GW	USCS SOIL SYMBOL for GRAVELS	

Cells Used For Patterning Strata

Stratum	Cell	Material Name	Pattern
LIM	LIME	LIMESTONE	
MAR	MARB	MARBLE	
MH	MH	USCS SOIL SYMBOL for SILTS and CLAYS	
ML	ML	USCS SOIL SYMBOL for SILTS and CLAYS	
OH	OH	USCS SOIL SYMBOL for SILTS and CLAYS	
OL	OL	USCS SOIL SYMBOL for SILTS and CLAYS	
PT	PT	USCS SOIL SYMBOL for PEAT or HIGHLY ORGANIC SOILS	
QUA	QUAR	QUARTZITE	
RHY	RHYO	RHYOLITE	
SAN	SAND	SANDSTONE	
SC	SC	USCS SOIL SYMBOL for SAND	
SCH	SCHI	SCHIST	
SHA	COMSHA	COMPACTED SHALE	
SLA	SLAT	SLATE	
SM	SM	USCS SOIL SYMBOL for SAND	
SOA	SOAP	SOAPSTONE or SERPENTINE	
SP	SP	USCS SOIL SYMBOL for SAND	
SW	SW	USCS SOIL SYMBOL for SAND	
TUF	TUFF	TUFF or TUFF BRECCIA	
WD	WOOD	WOOD	

APPENDIX E - SPECIFYING CELLS FOR PATTERNING

1. The BP patterning routine (BP_PASS2.EXE) has a built-in table of strata names and associated cell library cells which it uses to select the standard symbol to pattern the boring log strata. The strata names correspond to field 7 of a boring log data record. See **Appendix D** for a table of the strata identifiers and cell names provided with BP.

2. Users may extend or modify the table by creating an ASCII data file containing a list of strata and the cells to use when patterning them. When it needs to determine which cell to use for a given strata, BP will examine the list first before checking the built-in table. This allows users to re-define or add to the table used by BP.

Follow these steps to create the data file:

1) Using a text editor or word processor, create an ASCII text file named BP_PASS2.DAT in the BP executable directory (i.e., the directory where you installed the BP system files). This file *must* reside in the same directory as the BP executables or it will not be found and utilized. If you use a word processor to create this file, be sure to save it as an 'unformatted' ASCII file.

2) Edit the BP_PASS2.DAT file, entering one strata name and its accompanying cell on each line. The strata name should come first, followed by the cell name. Separate the two names by at least one space. Strata names may be up to three characters in length. Cell names may be up to six characters in length. The names may be in upper or lower case.

3) Make sure the cells you specify exist in the cell library you are using with BP.

3. The example BP_PASS2.DAT file below would force BP to pattern 'XYZ' strata with an 'OMEGA' cell and 'AB' strata with an 'ALPHA' cell:

```
XYZ OMEGA
AB ALPHA
```

Waterways Experiment Station Cataloging-in-Publication Data

Nash, Keith.

User's guide for the Boring Log Design File Builder : version 2.01 / by Keith Nash ; prepared for Department of the Army, U.S. Army Corps of Engineers ; monitored by Geotechnical Laboratory, U.S. Army Engineer Waterways Experiment Station.

32 p. : ill. ; 28 cm. -- (Instruction report ; GL-92-2)

1. Boring -- Computer programs. 2. Core drilling -- Data processing. 3. Information storage and retrieval systems -- Boring -- Handbooks, manuals, etc..

I. Title. II. United States. Army. Corps of Engineers.

III. U.S. Army Engineer Waterways Experiment Station. IV. Computer Applications in Geotechnical Engineering (CAGE) Project. V. Series: Instruction report (U.S. Army Engineer Waterways Experiment Station) ; GL-92-2.

TA7 W34i no.GL-92-2

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	Title	Date
Miscellaneous Paper GL-79-19	Results of Geotechnical Computer Usage Survey	Aug 1979
Miscellaneous Paper GL 82-1	Geotechnical Computer Program Survey	Mar 1982
Instruction Report GL-83-1	Geotechnical Construction Control Data Base System	Apr 1983
Instruction Report GL-84-1	Boring Information and Subsurface Data Base Package, User's Guide	Sep 1984
Miscellaneous Paper GL-85-8	Criteria for Limit Equilibrium Slope Stability Program Package	May 1985
Instruction Report GL-85-1	Microcomputer Boring and Subsurface Data Package, User's Guide	Sep 1985
Instruction Report GL-85-2	Piezometer Data Base Package, User's Guide	Oct 1985
Instruction Report GL-87-1	User's Guide: UTEXAS2 Slope-Stability Package; Volume I, User's Manual	Aug 1987
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Instruction Report GL-92-2	User's Guide for the Boring Log Design File Builder, Version 2.01	May 1992